Trend Study 25C-14-98

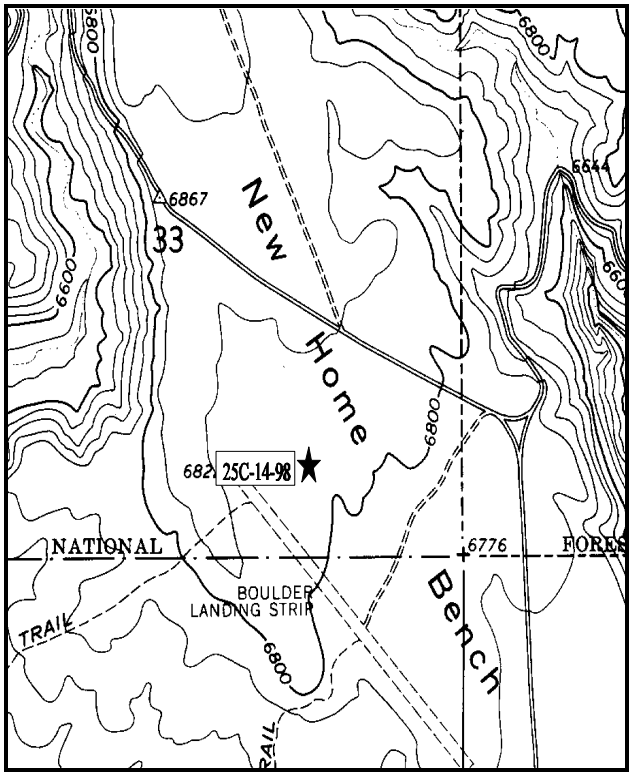
Study site name: New Home Bench . Range type: Big Sagebrush .

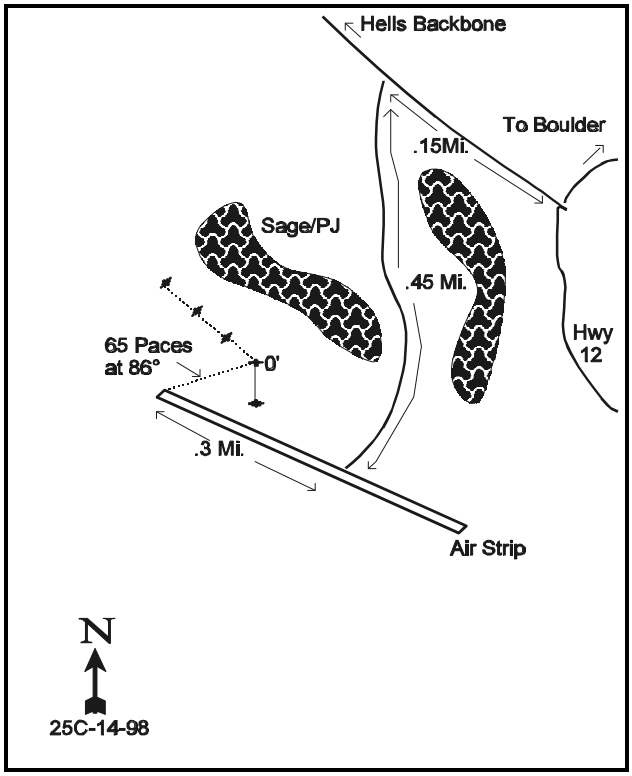
Compass bearing: frequency baseline 165 M degrees. Lines 2-4 346°M.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Take SR12 southwest out of Boulder for approximately 3 miles to the top of the bench above Dry Hollow. Turn onto the Hells Backbone-Salt Gulch Road. Travel 0.15 miles northwest to a road turning off to the left. Go 0.45 miles on this road to the Boulder airstrip. Turn right and drive down the airstrip 0.3 miles. The transect starts approximately 65 paces from the end of the airstrip, bearing 86 degrees. The 0-foot baseline stake, a 1-foot tall fence post, is marked by browse tag #7145.





Map Name: Boulder Town Diagrammatic Sketch

Township 33S , Range 4E , Section 33 UTM 4193394.211 N, 459012.327 E

DISCUSSION

Trend Study No. 25C-14 (51B-3)

The New Home Bench study site is on the south side of Boulder Mountain, where the sagebrush range type occupies a relatively small area, and is usually found interspersed with pinyon-juniper woodland. These sage flats, such as the one on New Home Bench, are important as deer winter ranges. The large bench where the trend study is located is nearly level with a slope of 1-2% and an east to northeast aspect. Elevation is 6,800 feet. The small drainage east of the study site drains toward the south. Data from the nearby New Home Bench (6,900ft) pellet group transect indicates an average of 13 deer days use/acre between 1987-88 and 1990-91 (Jense 1992), down to an average of only 4 ddu/acre between 1991-92 and 1995-96 (Evans 1996). Pellet group data from the site in 1998 estimate a much higher use at 66 deer days use/acre. A couple of cow pats were also encountered. This area is in a summer grazing, 3 pasture rest rotation grazing system. The season of use is from mid June to mid October.

The soil is a sandy loam with a neutral pH (6.8). Effective rooting depth (see methods) is estimated at just over 13 inches with little rock on the surface or within the profile. Soil is loose and susceptible to both wind and water induced soil disturbance. The sparse vegetative, litter, and cryptogram cover provide some soil protection, but bare soil is abundant averaging 58% cover since 1987. The well developed cryptogams on this site are an important factor in soil stabilization with ground cover estimates of 10% in 1987 increasing to 12% by 1998. However, cryptogamic cover are concentrated only under sagebrush canopies. Erosion is not severe, however localized soil movement is occurring and soil pedestaling is evident around shrubs.

The dominant vegetation on the site is an old stand of Wyoming big sagebrush. First impressions indicate a stand composed only of moderately to heavily hedged mature and decadent plants. However, close examination during the 1987 reading of the density plots yielded a population split more evenly among age classes than first thought. The seedlings (biotic potential of 12%), young (24%), mature (37%), and decadent (39%) made up the 2,332 plants/acre in 1987. In 1991, the number of seedlings dropped to only 1% of the population (33 plants /acre) and young remained constant at 24%. Density increased to 4,120 plants/acre in 1998, due largely to the much larger sample used that year. This new sample better estimates shrub populations which often have aggregated and/or discontinuous distributions. The major difference between 1991 and 1998 is in the number of mature plants which increased from 300 to 2,140 plants/acre. Young and decadent sagebrush were found in similar densities compared to 1991 data. Utilization of Wyoming big sagebrush was moderate to heavy in 1987 and 1991, but more moderate in 1998. Poor vigor and percent decadence peaked in 1991 at 35% and 63% respectively. Currently, vigor is good on all but 17% of the decadent plants. Percent decadence has declined to 35%. Dead plants, first counted in 1998, are numerous at 1,240 plants/acre. It would appear that the sagebrush on this site has a relatively rapid turnover.

There are a few other browse species which also provide some forage including ephedra and a few slenderbush eriogonum. In 1987, broom snakeweed was reported to be aggressively invading the disturbed sites along the roads, but was infrequent within the sagebrush. The larger sample size used in 1998 picked up broom snakeweed on the site with an estimated density of 2,720 plants/acre. Age class distribution would indicate an expanding population. Pinyon and juniper trees also appear to be increasing on the flat. Point quarter data from 1998 estimate 28 pinyon and 26 juniper trees/acre with an average diameter of 3.4 and 3.7 inches respectively. Mature trees are in the 8 to 10 foot range.

Density and diversity of herbaceous plants is very low. Blue grama is the only common perennial grass species with a quadrat frequency of 59% in 1991, declining to 35% by 1998. Bottlebrush squirreltail and needle-and-thread are moderately abundant. The most abundant grass on the site is the annual, sixweeks fescue. It is very low growing and provides little useful forage. Forbs are depleted and nearly absent.

1991 TREND ASSESSMENT

The soil trend at this time would be considered stable to slightly declining. Basal vegetative cover did increase to 6%, and the high proportion of bare ground also increased slightly. Percent litter cover has decreased from only 28% down to 21%. Recent soil movement was detectable on the site in 1991 and washes in the area are active. There appeared to be a great deal of soil pedestaling around the sagebrush. Wyoming big sagebrush, the key browse species, increased it's population by a little over only 1%, but percent decadency has gone up from 39% to 63%. Biotic potential in 1987 was at 14% and in 1991 it was only at 1%. This would indicate a slightly downward trend for key browse on this site. Grass species either declined in quadrat frequency or remained unchanged since the last reading. One species of note, Indian ricegrass, had a noteworthy increase in quadrat frequency. With the exception of scarlet globemallow, none of the forbs encountered in 1987 were still growing on the site in 1991, so the trend for herbaceous understory is down.

TREND ASSESSMENT
soil - stable to slightly declining
browse - slightly downward
herbaceous understory - down

1998 TREND ASSESSMENT

Trend for soil is up slightly due to a decline in percent bare ground and an increase in litter cover. Trend for Wyoming big sagebrush is up slightly. The increase in density is partly due to the larger sample used in 1998, but vigor is improved and percent decadence has declined from 63% to 35%. Reproduction is also improved since 1991. Trend for the herbaceous understory is stable and depleted. Sum of nested frequency of perennial grasses and forbs remained similar to 1991 estimates. The annual, sixweeks fescue, increased significantly in nested frequency and is now the most abundant grass on the site. Forbs are severely lacking.

TREND ASSESSMENT
soil - up slightly
browse - up slightly
herbaceous understory - stable, but depleted

HERBACEOUS TRENDS --
Herd unit 25C, Study no: 14

Type	Species	Nested Frequency '87	'91	'98	Quadrat Frequency '87	'91	'98	Average Cover % '98
G	Bouteloua gracilis	b149	b144	a91	65	59	35	4.32
G	Oryzopsis hymenoides	1	13	6	1	5	4	.05
G	Sitanion hystrix	a19	a19	59	11	11	25	1.23
G	Stipa comata	a25	a13	b47	14	7	26	1.27
G	Vulpia octoflora (a)	-	a18	b202	-	12	64	8.65
Total Annual Grasses		0	18	202	0	12	64	8.65
Total Perennial Grasses		194	189	203	91	82	90	6.90
F	Cryptantha fulvocanescens	2	-	-	2	-	-	-
F	Descurainia pinnata (a)	-	-	5	-	-	2	.01
F	Eriogonum spp.	-	-	6	-	-	2	.06

Type	Species	Nested Frequency '87	'91	'98	Quadrat Frequency '87	'91	'98	Average Cover % '98
F	Erigeron pumilus	-	-	2	-	-	1	.00
F	Machaeranthera canescens	4	-	-	2	-	-	-
F	Phlox longifolia	4	-	-	3	-	-	-
F	Sphaeralcea coccinea	$_{b}$9	$_{b}$6	$_{a}$-	5	5	-	-
F	Unknown forb-perennial	3	-	-	1	-	-	-
Total Annual Forbs		0	0	5	0	0	2	0.04
Total Perennial Forbs		22	6	8	13	5	3	0.03

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 25C, Study no: 14

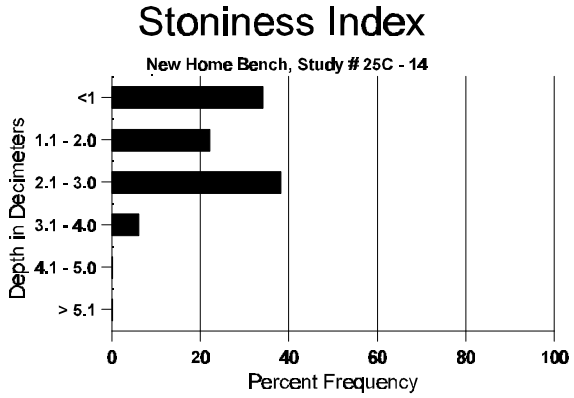
Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	85	18.72
B	Ephedra torreyana	4	-
B	Eriogonum microthecum	2	.03
B	Gutierrezia sarothrae	31	.95
B	Juniperus osteosperma	1	.38
B	Opuntia spp.	2	-
B	Pinus edulis	0	-
Total for Browse		125	20.08

BASIC COVER --
Herd unit 25C, Study no: 14

Cover Type	Nested Frequency '98	Average Cover % '87	'91	'98
Vegetation	298	3.00	5.75	31.96
Rock	27	0	0	.22
Pavement	121	0	.25	2.53
Litter	383	27.50	20.50	29.28
Cryptogams	186	10.00	10.75	12.31
Bare Ground	362	59.50	62.75	51.56

SOIL ANALYSIS DATA --
Herd Unit 25C, Study # 14, Study Name: New Home Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.3	59.6 (14.3)	6.8	69.4	12.0	18.6	1.0	12.4	112.0	.5



PELLET GROUP FREQUENCY --
Herd unit 25C, Study no: 14

Type	Quadrat Frequency '98
Rabbit	38
Deer	38

BROWSE CHARACTERISTICS --
Herd unit 25C, Study no: 14

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	87	9	1	-	-	-	-	-	-	-	10	-	-	-	333			10
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	33			1
	98	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
Y	87	9	6	2	-	-	-	-	-	-	17	-	-	-	566			17
	91	7	4	-	-	2	-	4	-	-	17	-	-	-	566			17
	98	15	6	6	-	-	-	-	-	-	27	-	-	-	540			27
M	87	3	11	12	-	-	-	-	-	-	26	-	-	-	866	29	30	26
	91	-	1	3	-	3	2	-	-	-	9	-	-	-	300	21	28	9
	98	54	45	8	-	-	-	-	-	-	107	-	-	-	2140	22	32	107
D	87	9	3	15	-	-	-	-	-	-	20	-	1	6	900			27
	91	2	10	10	1	9	12	1	-	-	20	-	3	22	1500			45
	98	36	30	6	-	-	-	-	-	-	60	-	-	12	1440			72
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	1240			62

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	29%	41%	10%	+ 1%
'91	41%	38%	35%	+43%
'98	39%	10%	06%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'87	2332		39%
	'91	2366		63%
	'98	4120		35%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ephedra torreyana																		
Y	87	-	1	-	-	-	-	-	-	-	1	-	-	-	33			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	2	-	-	-	-	-	-	-	2	-	-	-	40			2
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66	9	6	1
	98	-	2	5	-	-	-	-	-	-	7	-	-	-	140	11	12	7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	100%	00%	00%	+50%
'91	100%	00%	00%	+63%
'98	44%	56%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	33	Dec:	-
	'91	66		-
	'98	180		-

Eriogonum microthecum																		
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'91	0		-
	'98	40		-

Gutierrezia sarothrae																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	18	-	-	-	-	-	-	-	-	18	-	-	-	360			18
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	40	-	-	-	-	-	-	-	-	40	-	-	-	800			40
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	93	-	-	2	-	-	-	-	-	95	-	-	-	1900	8	9	95
D	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	0%
	'91	0		0%
	'98	2720		1%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'91	100%	00%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'91	66		-
	'98	20		-

Opuntia spp.																		
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	4	-	-	-	-	-	-	-	-	4	-	-	-	80	2	7	4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'91	00%	00%	00%	-40%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'91	133		-
	'98	80		-

Pinus edulis																		
S	87	-	-	-	-	-	-	1	-	-	-	1	-	-	33			1
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	33			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	87	-	-	-	-	-	-	-	1	-	1	-	-	-	33	118	98	1
	91	1	-	-	1	-	-	-	-	-	2	-	-	-	66	152	86	2
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	+ 0%
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	66	Dec:	-
	'91	66		-
	'98	0		-